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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of
Tatsuya, Anma
Tadashi Takano

App. No.:	09/683997
Filed:	March 11, 2002
Conf. No.:	4716
Title:	PERMANENT MAGNET TYPE THREE-PHASE AC ROTARY ELECTRIC MACHINE
Examiner:	D. Le
Art Unit:	2834

I hereby certify that this correspondence and all marked attachments are being deposited with the United States Patent Office via fax to (703) 872-9319 on:
November 12, 2003
Ernest A. Beutler
Reg. No. 19901

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPELLANTS' BRIEF

Dear Sir:

RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences the outcome of which would affect this case or which would be affected by the decision in this case.

REAL PARTY IN INTEREST

In addition to the applicants, the real party in interest is their assignee, Kabushiki Kaisha Moric, a Japanese company.

STATUS OF THE CLAIMS

Claims 1 through 9 remain in this application and all are before the Board on this appeal.

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STATUS OF AMENDMENTS

No amendment to the claims was proposed subsequent to the Final Rejection of May 27, 2003. but a request for reconsideration was filed and in responding to that the Examiner incorrectly checked the box in the Advisory Action indicating that the amendment, none of which was proposed, would be entered. Thus the claims before the Board are in the form as finally rejected. A clean copy of them appears in the appendix.

APPELLANTS' INVENTION

Appellants' invention relates to a rotary multi-phase electrical machine, such as a three-phase AC generator and a three-phase AC motor and more particularly to an improved coil winding arrangement therefore that uses a small number of turns of small diameter wire to provide good efficiency. This is achieved by connecting the coils in each phase in parallel to lower the current therein. However appellants have discovered that when the coils of each phase are connected in parallel, a circulating current is generated in a closed circuit formed of the coils connected in parallel. This has been discovered because the phase difference of the electromotive force or a counter electromotive force generated in each coil results in performance deterioration.

The invention avoids this by utilizing a parallel circuit formed by connecting a plurality of series circuits in parallel. The cores used in each of the series circuits are so combined that electromotive voltages or counter electromotive voltages generated across opposite ends of the plurality of series circuits of each phase are substantially because of the symmetry of arrangement of the permanent magnets and the coils and the fact that the coils of each series circuit are oppositely wound, thereby preventing generation of a circulating current in the parallel circuit.

FIG. 2 is a specific example of this principle where it is seen that the windings of the coils of each series circuit are oppositely wound. The invention is more fully described by reference to the drawings in the specification under the appropriate heading.

ISSUES BEFORE THE BOARD

At issue before the Board is whether the subject matter of claims 1-4 and 7-9 is obvious under 35 USC 103(a) in view of Japan 2001-197696 (Naoki), cited by applicant, in view of Nishio et al 5,006,745 (Nishio et al).

Also at issue is whether the subject matter of claims 5 and 6 is obvious under 35 USC 103(a) in view of the combination applied against claims 1-4 and 7-9 in further view of Kilgore 2,575,716 (Kilgore).

GROUPING OF CLAIMS

Claims 2-4 and 7-9 stand or fall with claim 1.

Claims 5 and 6 stand or fall together

APPELLANTS' ARGUMENT

Claim 1 the only independent claim in the application calls for the overall combination having the "plurality of series circuits in parallel" and this is admittedly what is shown in the Naoki et all reference. It is also admitted that Naoki et al's purpose is the same as appellants. However, appellants go a step further in solving the problem. As is noted in paragraph 0007 of appellants' specification, "it has been found that, when the coils of each phase are connected in parallel, a circulating current is generated in a closed circuit formed of the coils connected in parallel by a phase difference of an electromotive force or a counter electromotive force generated in each coil, resulting in performance deterioration". Thus Naoki et al's construction, although intended to decrease circulating current does not totally eliminate it. In fact it has been found not to solve the problem.

The Examiner agrees that Naoki does not show alternately wound coils but states that they are well known in the art. This is also not disputed. However the art does not teach that Naoki et al's construction could be improved by using the alternately wound coils. Even Naoki et al, who was working to solve the problem did not realize their performance could be improved in this way.

The Nishio et al reference does not teach or suggest that it could be used to reduce the circulating current in circuits having parallel circuits comprised of series wound coils. Thus the teaching for making this modification is not taught by the prior art. Applicants made this discovery and it is their teaching not the prior art that suggests the combination. If the combination was obvious, why did not Naoki et al employ it since they were trying to solve the problem? The combination is only obvious after one sees appellants' invention and hindsight reasoning is not permitted to support a rejection under 35 USC 103. The most simple inventions always appear obvious in retrospect.

Claims 2-4 and 7-9 stand or fall with claim 1.

Claims 5 and 6 add to claim 1 the fact that the windings are connected in a Δ configuration. Although such winding configurations are known, as evidenced by the Kilgore reference cited by the Examiner he does not use the parallel series connection being claimed or used by Naoki et al. Since this latter reference shows a number of embodiments, but not this winding arrangement, it must again be assumed that Naoki et al did not recognize that his invention could be so used. Thus it appears that again the Examiner is using hindsight reasoning.

In view of the foregoing, it is most respectively submitted that the Examiner's rejections do not make out a prima facia case of obviousness and therefore should be reversed.

Respectfully submitted:

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Attachment: Credit Card Authorization for Brief Fee

BRIEF APPENDIX

CLEAN COPY OF CLAIMS ON APPEAL

1. A permanent magnet type three-phase AC rotary electric machine including a permanent magnet element having a number of permanent magnet poles and a coil winding element having a number of slots, each of said three phases being connected in a line current circuit and being comprised of a parallel circuit formed by connecting a plurality of series circuits in parallel, said coil winding element comprising cores of each of said series circuits being encircled by alternately wound coils combined such that electromotive voltages or counter electromotive voltages generated across opposite ends of said plurality of series circuits forming each phase are substantially the same based on symmetry of arrangement of said permanent magnets and said coils, thereby preventing generation of a circulating current in said parallel circuit.

2. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 1 wherein the permanent magnet element has n-number of permanent magnet poles and the coil winding element has m-number slots and the value of m is at least 6.

3. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 1 wherein the phases are connected in a Y configuration.

4. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 3 wherein the permanent magnet element has n-number of permanent magnet poles and the coil winding element has m-number slots and the value of m is at least 6.

5. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 1 wherein the phases are connected in a Δ configuration.

6. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 5 wherein the permanent magnet element has n-number of permanent magnet poles and the coil winding element has m-number slots and the value of m is at least 6.

7. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 2 wherein the number n of poles and said number m of slots have a common devisor.

8. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 2 wherein the number m of slots is a multiple of 3 represented as 3M, M is at least 4, M coils corresponding to one phase are divided into L sets each comprising M/L coils connected in series.

9. A permanent magnet type three-phase AC rotary electric machine as set forth in claim 2 wherein the number n of poles and the number m of slots satisfy the following relations, respectively:

$n = 2N$, $m = 3M$

wherein N and M are integers, and also satisfy the following equation;

$2m/3 < n < 4m/3$.